

# Chapter Six

## Tree Selection

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### *Importance of Proper Tree Selection* *City-Approved Replacement Tree Species List*



### **City of Carlsbad** **Community Forest Management Plan**

## Chapter 6 - Tree Selection

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### Importance of Proper Tree Selection

Tree selection requires careful consideration prior to planting. Every year, well-intentioned people plant many trees in spaces that are not appropriate. The result is often removal of these trees before they reach maturity, the time when benefits are maximized.

Tree species that are planted outside their preferred site conditions are immediately stressed. This stress could lead to tree decline or mortality. Tree decline can take many years,



resulting in trees that exist in a cycle of decline until they finally succumb to the many pressures placed on urban trees. Decline causes trees to have shorter life spans, adding significantly to a city's long-term maintenance costs. Finally, declining trees often do not appear vigorous or healthy, attracting attention due to their unpleasant aesthetics and detracting from the value and overall beauty of the community forest. Selecting trees compatible with the growing environment in Carlsbad will reduce the possibility of premature tree decline.

Proper tree selection can help trees survive longer in their planting spaces. The vast majority of problems caused by tree roots or branches are, in reality, caused by the tree planter (Irvine Public Works 1991). Trees generally have very predictable and well-known growth patterns for both their roots and crown. Conflicts resulting from a tree's roots or crown occur mainly because the tree was not given enough available growing space to fully develop. Understanding the relationship between the size of a given tree species at maturity and the available growing space at a selected planting site will go far toward reducing conflicts and the cost of tree maintenance.

It is prudent to maintain healthy proportional tree species representation in the overall tree population to reduce the potentially devastating impacts of an unforeseen insect, disease, or other disaster. It is recommended that each tree species represent no more than 5- to 10-percent of the total tree population. This concept is universally supported within the urban forestry profession.

Many cities have adopted general guidelines that place limits on the total number of any single species in the community forest. For example, the guidelines would seek to limit individual tree species at the City-wide level to less than five- percent of the total tree population (Miller 1988). Individual tree species at the community level should be limited to less than ten- percent of the community tree population. Individual tree species at the street level should be limited, in most cases, to less than 100 percent of the street tree population

(avoid monocultures). These guidelines can provide general direction when tree-planting decisions are made.

This does not mean that small areas, neighborhoods, for example, should only be planted with many different species. Tree species diversity on the city-scale is the goal. Neighborhoods may be planted with as few as one or two species for unifying purposes. It would be wise to plant more than one species in these areas, but on such small scale, the potential for impacting the City-scale diversity is low. The forest outside the STAD currently is very diverse and offers great potential for offsetting large-scale tree mortality from species specific infestations or infections at the street level.

### **City Approved Replacement Tree Species List**

To minimize long-term costs and maximize tree-provided benefits, the right tree must be planted at each designated planting site. Proper species selection should equate to a diversified mix of species. This means that planning for the best species for a given site must include ecosystem-level planning to avoid mono-culture-effects on the landscape (Thompson, et. al. 1994). The principles most utilized in urban forest design for achievement of sustainability are:

- 1) size/age class distribution
- 2) size/age class and species richness
- 3) management practices to maintain forest health and growth

In order to provide a measure of containment and management, a list of suitable trees for varying sites has been prepared. Table 4, page 24 – 25 presents this list of trees that are appropriate for urban settings within the City and that have been authorized as the tree replacement species list for all tree replacements and new plantings within the STAD. The trees are separated into small, medium, and large planting sites. A small planting site would be any planting site that measures no larger than 3' x 3', medium planting sites measure no larger than 6' x 6', and a large planting site includes all planting sites over 6' x 6'.

This list is the approved tree replacement list for the City. It must be noted that these trees may not be recommended for every planting site in a particular size range. Each planting site offers a number of positive and negative attributes that may or may not be appropriate for a given species. Soils, exposure, aspect, and other micro-environmental factors must be considered when selecting a tree for a particular space. In general, however, the trees in each category meet size requirements and limitations for expected planting space sizes. Representative visual samples of each of the 29 tree species from the approved list are provided in the photograph log in Appendix B.

The trees included in the approved City planting list generally perform well in coastal settings, are readily available from local nurseries, are relatively low maintenance, provide typical benefits of shade trees, include both deciduous and evergreen trees, and are known for minimal root infrastructure problems. Some of these trees are also approved for planting in confined planting spaces where structures or utility related apparatus may limit growth.

Limiting plantings within the STAD to the 29 species included in the approved planting list will enable the City to maintain diversity on the community and City level while still allowing unifying tree planting themes at the street-level. It also results in a healthier design for the

forest, by limiting the number of ill-advised plantings that would not contribute positively to the Community Forest.

**Table 4.** City Approved Replacement Tree List.

Botanical Name	Common Name	Height	Spread	Growth Rate	Longevity	Pest Disease	Irrigation Needs
<b>Large Planting Site Candidate Trees (Larger than 6' x 6')</b>							
<i>Cinnamomum camphora</i>	Camphor tree	40-60	50-70	Moderate	Long Lived	Mid Level	Moderate
<i>Eucalyptus citriodora</i>	Lemon gum	60-80	20-40	Fast	Moderate	Mid Level	Low
<i>E. saligna</i>	Sydney blue gum	150	50	Fast	Moderate	Low	Moderate
<i>Magnolia grandiflora</i>	So. magnolia	50-70	30-40	Moderate	Long Lived	Mid Level	Moderate
<i>Pinus canariensis</i>	Canary Island pine	60-90	30-40	Fast	Long Lived	Low Level	Low
<i>Podocarpus gracilior</i>	Fern pine	50-60	50-60	Slow	Long Lived	Mid Level	Moderate
<i>Quercus agrifolia</i>	Coast live oak	50-60	50-60	Moderate	Long Lived	High	Low
<i>Umbellularia californica</i>	California laurel	40-60	40-60	Slow	Long Lived	Low Level	Moderate
<b>Medium Planting Site Candidate Trees (3' x3' to 6' x 6')</b>							
<i>Archontophoenix cunninghamiana</i>	King palm	50-65	20	Moderate	Moderate	Low Level	Low
<i>Cassia leptophylla</i>	Gold medallion tree	20-30	20-30	Fast	Moderate	Mid Level	Moderate
<i>Fraxinus oxycarpa</i> 'Raywood'	Flame ash	30-40	25-35	Moderate	Moderate	High Level	Moderate
<i>Laurus nobilis</i>	Sweetbay	30-40	30-40	Moderate	Moderate	Low Level	Low
<i>Lophostemon confertus</i>	Brisbane box	30-45	20-25	Fast	Moderate	Low Level	Moderate
<i>Pistacia chinensis</i>	Chinese pistache	30-40	30-40	Moderate	Moderate	Low Level	Moderate
<i>Melaleuca quinquenervia</i>	Cajeput tree	30-40	15-20	Moderate	Moderate	Low Level	Moderate
<i>Pinus eldarica</i>	Afghan pine	40-50	40-50	Moderate	Long Lived	Mid Level	Low

<i>Podocarpus macrophyllus</i>	Yew pine	35-40	10-15	Slow	Long Lived	Mid Level	Moderate
<i>Quercus ilex</i>	Holly oak	40-50	40-50	Moderate	Moderate	Mid Level	Moderate
<i>Syagrus romanzoffianum</i>	Queen palm	45-50	20	Moderate	Moderate	Low Level	low
<b><i>Small Planting Site Candidate Trees (Smaller than 3' x 3')</i></b>							
<i>Acer oblongum</i>	Evergreen maple	20-25	20-25	Moderate	Moderate	Low Level	Moderate
<i>Agonis flexuosa</i>	Peppermint tree	25-30	25-30	Fast	Moderate	Low Level	Moderate
<i>Arbutus unedo 'marina'</i>	Strawberry tree	10-30	10-30	Slow	Moderate	Low Level	Low
<i>Brahea armata</i>	Mexican blue palm	35	15-20	Moderate	Moderate	Low	Low
<i>Brahea edulis</i>	Guadalupe palm	35	10-15	Moderate	Moderate	Low	Low
<i>Callistemon citrinus</i>	Lemon bottlebrush	10-15	10-15	Moderate	Short Lived	Mid Level	Low
<i>Eucalyptus ficifolia</i>	Red flowering gum	20-45	15-60	Moderate	Moderate	Low Level	Moderate
<i>Lagerstroemia hybrids</i>	Crape myrtle	15-25	10-20	Moderate	Moderate	Mid Level	Moderate
<i>Metrosideros excelsus</i>	New Zealand christmas tree	15-30	15-30	Moderate	Moderate	Low Level	Moderate
<i>Prunus cerasifera 'Thundercloud'</i>	Purple-leaf thundercloud	15-25	15-25	Moderate	Short Lived	High Level	Moderate

*Factors affecting tree species inclusion in the approved list include: tree form, size at maturity and at planting, height, canopy spread, height to canopy bottom, canopy density, trunk size, root habit, rate of growth, longevity, habitat requirements, irrigation needs, shade tolerance, insect and disease problems, wood strength, litter, texture, flowers, fruits, bark, objectionable features, and wildlife benefits.*

As tree populations approach the target maximum goals for the City-, community-, or street-level tree populations, reliance on that species should be reduced and other tree species should be planted. As such, this list of approved species must be flexible enough through time and adjustments made to react to the ever-changing needs of the urban forest. Pests, die-off, storm damage, and other events can drastically alter the tree population and necessitate drastic planting measures to regain appropriate and healthy species diversity. Reevaluation of the approved species list including adding and removing species, as necessary is a proactive means of maintaining healthy, diverse, community forest.

As discussed in the previous chapter, it is recommended that tree planting in the STAD consider unifying tree themes within neighborhoods and communities. Two to several tree species may be planted on a particular street. Current tree species distribution (1993 data) within the STAD is available in a graphical format through the City Parks Division of Public Works.

It is also recommended that tree planting be conducted concurrently with every removal, where planting space allows. A successful tree planting program would include planting a tree for each removal and then also planting a percentage of the vacant spaces such that the vacant spaces will be planted within a given time frame, ten years, for example.